

Students As Scholars Institute (SASI): Developing Student Researchers in Secondary Education

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What is SASI?

- ❧ SASI is scientists, students and teachers coming together to learn about and share research pertaining to life and earth sciences and how they work as a system.
- ❧ A day long event where students can explore the on-site demonstrations of field data collection by working scientists.
- ❧ An opportunity for students to develop their own work inspired by research scientists.
- ❧ Critical thinking skills honed through GLOBE protocols and activities
- ❧ International relationships and connections through data posting on GLOBE website.
- ❧ Student work published on the internet.
- ❧ A Connections Celebration where students, scientists and teachers can reflect, revise and renew ideas.



PURPOSE

- ❧ Teach students how to approach problems, not present them with the answers.
- ❧ Create real-life applications of science and math concepts with authentic data while fulfilling grade level standards.
- ❧ Establish world-wide connections and identify system relationships through GLOBE protocols.
- ❧ Establish mentorships.
- ❧ Explore career possibilities.



Step One

- ❧ Define the space where SASI will take place
- ❧ Outdoor classrooms
- ❧ Local Parks
- ❧ Green Space
- ❧ Stream Corridors
- ❧ Apply for Environmental Grants to enhance outdoor facility
- ❧ Approach community for help on classrooms
- ❧ Boy Scouts



Step Two

- ❧ Contact (email) possible scientists for inclusion in project
- ❧ Regional GLOBE Representative
- ❧ Universities – Ecology and Evolutionary Biology, Geosciences, Natural History Museums, Biological Survey Groups, Environmental Studies, Soil Conservation, Atmospheric Studies, Monarch Watch groups
- ❧ State Conservation Departments
- ❧ Hospitals with air quality teams
- ❧ Private Industry
- ❧ If you have a local orienteering group, see if they will help you with a topographic map with outdoor classroom locations for the day of the event.

Beginning the Student Process

- Review metric measurements and metric conversions through hands-on labs.
- Discuss the Spiral Path of Inquiry, process of discovery, and revelation of new understandings
- Introduce the concept of data collection through GLOBE protocols and GLOBE activities.
- Include graphing opportunities
- Invite scientists to speak in classroom.
- Involve students in trail and outdoor classroom maintenance and creation.
- Examine data on GLOBE website from other locations.
- Review current scientific articles and periodicals



Possible Activities

- œ Heat capacity of different mediums lab introduces surface temperature and thermal measurements
- œ Investigations of water pollution introduce concepts of mixture, solution, emulsion, suspension and colloid.
- œ Have air quality technicians show how they take particulate counts in the school and in different external environments.



- œ Show interrelationship between GLOBE Protocols and how they work as a system

Planning the Event

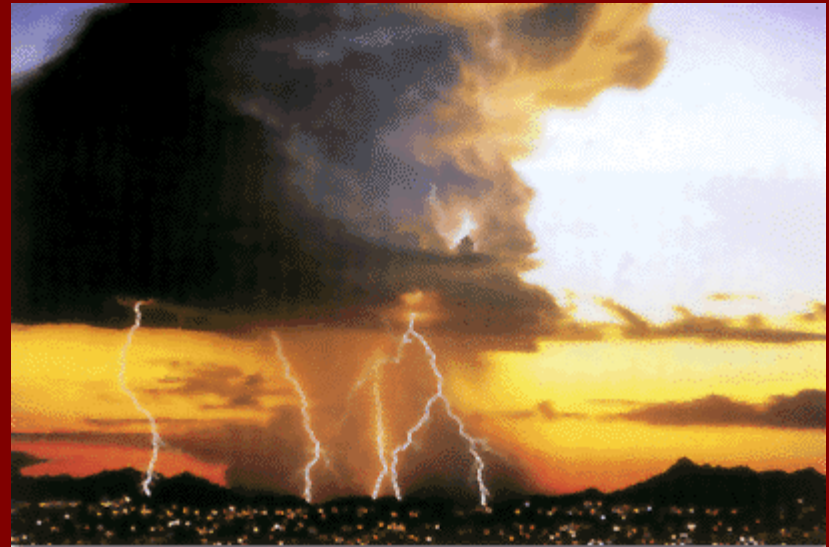
- ❧ Get other teachers from your district on board by getting them in on the planning. Communication Arts teachers could work on science article summaries from current science articles or study nonfiction ecological writings. Geography teachers could create topographic maps of the proposed event area to fulfill longitude and latitude standards. Art teachers could design and create recycle-reuse sculpture for event area. Industrial tech classes could design identification signs for trees and plants, construct bird house or nesting boxes, or design riparian corridor landscape repair
- ❧ Invite students from schools with diverse populations to create a free and divergent exchange of ideas. Be sure to have them bring an adult for each 6-7 students. This adult needs to travel with the group.
- ❧ Scientist – student ratio should be approximately 1 to 6-7.
- ❧ Start confirming on scientists on a regular basis as their schedules change frequently. Inquire what type of setup they might need (i.e. tables, easels).
- ❧ Have a contingent plan for bad weather – such as open canvas tents for scientists field studies.

Planning the Event (cont.)

- ☞ Contact an outside organization to help with lunch or meals – PTA's are a wonderful help.
- ☞ Contact Boy Scouts to help with trail or outdoor classroom construction as part of an Eagle Scout project.
- ☞ Establish requirements for the student project and rubrics. Options might include; a project inspired by the work of one of the scientists, a photo-journal of an environmental problem in the community, or a video of the event.
- ☞ Establish a website where students and teachers can access for information on the event. Include biographies of the scientists attending and link them to the scientist's own web page. List the schools attending. Link a blog to the page so students can talk to each other.
- ☞ Be sure to video the presentation of each scientist and post on the website for students and teachers to refer to.
- ☞ Make a schedule for each student group so that they get to meet with each scientist. Know that it will changing up to the morning of the event.

Day of the Event

- ☞ Be flexible.
- ☞ Set up early
- ☞ Have a gathering spot for the students and scientists – they won't all get there at the same time. Donuts and hot chocolate make for a contented and congenial group.
- ☞ Have maps for each group with the order of which scientist to go to. Be sure to include a slot for lunch.
- ☞ Options the day of the event might be an Orienteering Course as one time slot. Or have different environmental groups set up booths. Or have the students spend one slot working on a group sculpture.



Day's End

- ☞ Be sure to tell teachers when student projects are due (also post on website). Have extra copies of project criteria and rubrics (also post on website).
- ☞ Handout a contact list of scientists who are willing to be contacted by students or to act as mentors. We were very lucky to have scientists who lent equipment to students for projects.
- ☞ Have a cleanup crew to help scientists carry equipment back to their cars.
- ☞ REST!



Student Projects

- œ In the classroom reflect on the work of the scientists.
- œ Have students evaluate the day. How did they most benefit? What was most interesting? How would they have been more engaged?
- œ Have teachers and scientists evaluate the day.
- œ Brainstorm projects they students might design based on what they learned. Have them design the experiment or project. Check for time and material issues. Have students research topic before beginning project.

Connections Celebration

- ☞ Hold a celebration where the projects are displayed. Handout certificates and/or awards for outstanding efforts. Make it a community event with hands on activities relating to the SASI topic. Invite all students, teachers, parents, scientists, administrators and community members.
- ☞ Have students send their projects in as an electronic document. Post on the website by scientist that inspired the work. Students, teachers, and scientists can then access the student work.



Why this is a Good Project?

- ❧ The experience solidified the importance of the scientific method.
- ❧ Enabled us to design our own experiments and learn to research more efficiently and more in-depth.
- ❧ Emphasized the importance of GLOBE Protocols.
- ❧ Enabled us to publish our data on the GLOBE Website.
- ❧ Exposed us to different fields of scientific research and career opportunities in those fields.
- ❧ We were able to see the work of students from across the community.
- ❧ We made connections between school and real life situations.